

# SMD SWITCHING TRANSISTORS

## DESCRIPTION

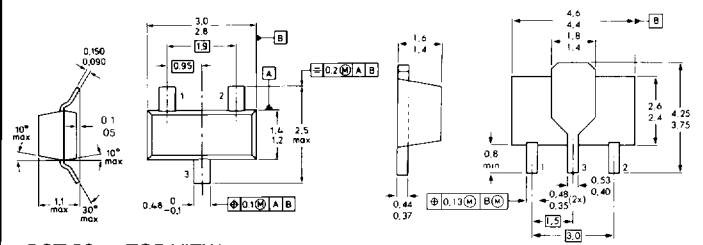
■ Philips Components switching transistors are fabricated using gold doping to reduce the minority carriers in the junction, thus improving the transition performance of the devices. All are specified for turn-off and turn-on times given resistive loaded circuits. These types are offered in a variety of surface mount transistor packages including the SOT-23, SOT-89 and the new SOT-223, which provide the designer options for addressing various power requirements, circuit board substrate materials, and assembly processing techniques.

## FEATURES

- Transition times under 12ns for high-speed saturated switching
- Complementary NPN and PNP pairs available
- Up to 1 Watt power dissipation rating @ 60°C on epoxy printed circuit boards with the new SOT-223 package
- Medium power devices offered in the SOT-89 package
- Continuous current ratings up to 1 A available

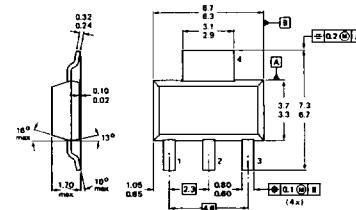
## MECHANICAL DATA

(Dimensions in mm)

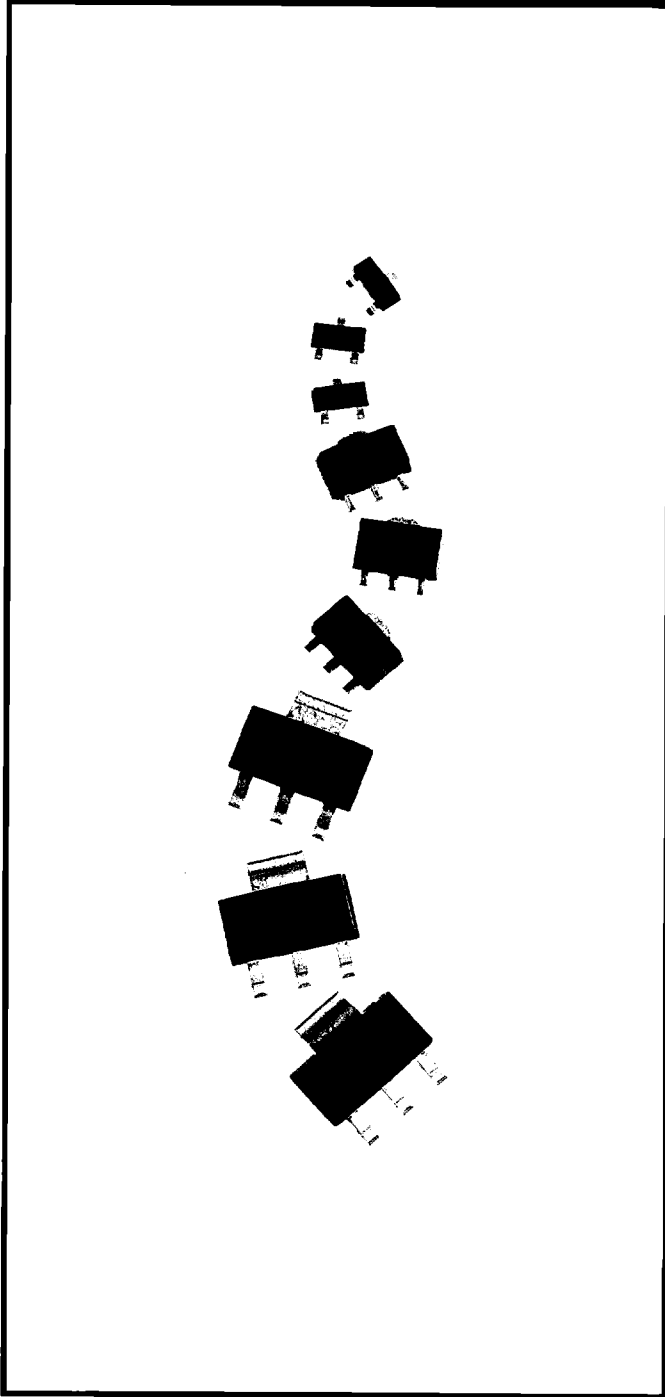


SOT-23 TOP VIEW

SOT-89 BOTTOM VIEW



SOT-223



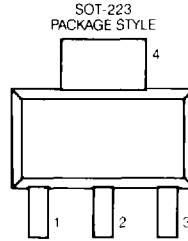
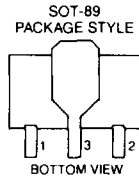
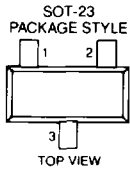
## SMD SWITCHING TRANSISTORS

### ELECTRICAL SPECIFICATIONS

TYPE	PACKAGE	RATINGS			hFE		V <sub>CE(sat)</sub>		t(max)		PINOUT
		V <sub>CEO</sub> V	V <sub>CBO</sub> V	I <sub>C</sub> mA	min./max. at I <sub>C</sub> /V <sub>CE</sub> mA/V		max. at I <sub>C</sub> /I <sub>B</sub> V mA/mA		on/off at I <sub>C</sub> /I <sub>B</sub> ns mA/mA		
<b>NPN</b>											
BSV52	SOT-23	12	20	100	40/120	10/1	0.4	50/15	12/18	10/3	F
PMBT2369	SOT-23	15	40	500	40/120	10/1	.25	10/1	12/18	10/3	F
BSR13	SOT-23	30	60	800	100/300	150/10	1.6	500/50	35/285	150/-	F
PMBT2222	SOT-23	30	60	600	100/300	150/10	0.4	150/15	35/285	150/15	F
PXT4401	SOT-89	40	40	600	100/300	150/1	0.4	150/15	35/255	150/15	F
PMBT4401	SOT-23	40	50	600	100/300	150/1	0.4	150/15	35/255	150/15	F
BSR17	SOT-23	40	60	200	50/150	10/1	0.3	50/5	70/225	10/1	F
BSR17A	SOT-23	40	60	200	100/300	10/1	0.3	50/5	70/250	10/1	F
BSR14	SOT-23	40	75	800	100/300	150/10	1.6	500/50	35/285	150/1	F
PMBT2222A	SOT-23	40	75	600	100/300	150/10	0.3	150/15	35/285	150/15	F
PXT2222A	SOT-89	40	75	600	100/300	150/10	0.3	150/15	35/285	150/15	F
PZT2222A	SOT-223	40	75	600	100/300	150/10	0.3	150/15	35/285	150/15	R
BSP40	SOT-223	60	70	1000	40/120	100/5	0.5	500/50	250/1000	100/5	R
BSP41	SOT-223	60	70	1000	100/300	100/5	0.5	500/50	250/1000	100/5	R
BSR40	SOT-89	60	70	1000	40/120	100/5	0.5	500/50	250/1000	100/5	F
BSR41	SOT-89	60	70	1000	100/5	100/5	0.5	500/50	250/1000	100/5	F
BSP42	SOT-223	80	90	1000	40/120	100/5	0.5	500/50	250/1000	100/5	R
BSP43	SOT-223	80	90	1000	100/300	100/5	0.5	500/50	250/1000	100/5	R
BSR42	SOT-89	80	90	1000	40/120	100/5	0.5	500/50	250/1000	100/5	F
BSR43	SOT-89	80	90	1000	100/300	100/5	0.5	500/50	250/1000	100/5	F
BSS64	SOT-23	80	120	100	20/80	10/1	0.2	50/15	/1000	15/1	F
<b>PNP</b>											
PMBT3640	SOT-23	12	12	80	20/-	50/1	0.6	50/5	25/35	10/5	F
BSR12	SOT-23	15	15	100	30/120	50/1	0.45	100/10	20/30	30/3	F
BSR18	SOT-23	40	40	200	50/150	10/1	0.40	50/5	70/250	10/1	F
BSR18A	SOT-23	40	40	200	100/300	10/1	0.4	50/5	70/300	10/1	F
PMBT4403	SOT-23	40	40	600	100/300	150/2	0.4	150/15	35/255	150/15	F
PXT4403	SOT-89	40	40	600	100/300	150/2	0.4	150/15	35/255	150/15	F
BSR15	SOT-23	40	60	600	100/300	150/10	1.6	500/50	45/100	150/15	F
PMBT2907	SOT-23	40	60	600	100/300	150/10	0.4	150/15	45/100	150/15	F
BSR16	SOT-23	60	60	600	100/300	150/10	1.6	500/50	45/100	150/15	F
PMBT2907A	SOT-23	60	60	600	100/300	150/10	0.4	150/15	45/100	150/15	F
PXT2907A	SOT-89	60	60	600	100/300	150/10	0.4	150/15	45/100	150/15	F
PZT2907A	SOT-223	60	60	600	100/300	150/10	0.4	150/15	45/100	150/15	R
BSP30	SOT-223	60	70	1000	40/120	100/5	0.5	500/50	500/650	100/5	R
BSP31	SOT-223	60	70	1000	100/300	100/5	0.5	500/50	500/650	100/5	R
BSR30	SOT-89	60	70	1000	40/120	100/5	0.5	500/50	500/650	100/5	F
BSR31	SOT-89	60	70	1000	100/300	100/5	0.5	500/50	500/650	100/5	F
BSP32	SOT-223	80	90	1000	40/120	100/5	0.5	500/50	500/650	100/5	R
BSP33	SOT-223	80	90	1000	100/300	100/5	0.5	500/50	500/650	100/5	R
BSR32	SOT-89	80	90	1000	40/120	100/5	0.5	500/50	500/650	100/5	F
BSR33	SOT-89	80	90	1000	100/300	100/5	0.5	500/50	500/650	100/5	F
BSS63	SOT-23	100	110	100	30/-	25/1	0.25	25/2.5	-	-	F

# SMD SWITCHING TRANSISTORS

## PINOUT DIAGRAMS



	PIN 1	PIN 2	PIN 3	PIN 4
PINOUT F: SOT-23	E	B	C	—
PINOUT F: SOT-89	E	B	C	—
PINOUT R: SOT-223	B	C	E	C

## MARKING CODES

Type No.	Code	Type No.	Code	Type No.	Code	Type No.	Code
BSP30	*	BSR15	T7	BSR41	AR2	PMBT3640	2J
BSP31	*	BSR16	T8	BSR42	AR3	PMBT4401	2X
BSP32	*	BSR17	U9	BSR43	AR4	PMBT4403	2T
BSP33	*	BSR17A	U92	BSS63	BM	PXT2222A	1P
BSP40	*	BSR18	T9	BSS64	AM	PXT2907A	2F
BSP41	*	BSR18A	T92	BSV52	B2	PXT4401	2X
BSP42	*	BSR30	BR1	PMBT2222	1B	PXT4403	2T
BSP43	*	BSR31	BR2	PMBT2222A	1P	PZT2222A	*
BSR12	B5	BSR32	BR3	PMBT2369	1J	PZT2907A	*
BSR13	U7	BSR33	BR4	PMBT2907	2B		
BSR14	U8	BSR40	AR1	PMBT2907A	2F		

\*See individual device data sheet.

## TAPE AND REEL SPECIFICATIONS

(Dimensions in mm)

SM Package	Devices per reel	Reel Size (in)	Tape Width (mm)	Ordering Suffix
SOT-23	3K	7	8	TRL
	10K	13	8	TRL 13
SOT-89	1K	7	12	TRL
	4K	13	12	TRL 13
SOT-223	1K	7	12	TRL
	4K	13	12	TRL 13

